

Novel Approach for Colour Object Recognition

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ABSTRACT

This paper discuss a novel approach to detect desired colour object using colour thresh-holding technique and sending that image to e-mail using MATLAB as an alert. The method involved in this approach is a web camera is used to continuously monitor the area and it converts the video into frames. By using some algorithms in Image Acquisition Toolbox the desired colour can be detected and the web camera will take a snapshot of the image, this image can be sent as an alerting message. This method can be very useful in security and searching applications like object tracking and can also be used in industries.

Keywords: MATLAB, colour thresh-holding technique, e-mail, Image Acquisition toolbox.

1. INTRODUCTION

Colour is one of the most important characteristics of an image. If the colour of an image can be detected, it can be used in many industrial and scientific applications. An image is a matrix of pixel values. MATLAB takes every input as a matrix

that is why, it is most commonly used platform for image processing. An image can be represented using many colour models like gray-scale, RGB, HSV etc. Here RGB model is used to detect the colours in an image. RGB model is a colour model in which red, green and blue lights are added together in various ways to produce wide range of colours. Image Acquisition Toolbox provides functions and blocks that enable you to connect industrial and scientific cameras to MATLAB and Simulink. It includes a MATLAB app that lets you interactively detect and configure hardware properties. The toolbox enables acquisition modes such as processing in the loop, hardware triggering, background acquisition, and synchronizing acquisition across multiple devices. Image Processing Toolbox provides a comprehensive set of reference-standard algorithms and workflow apps for image processing, analysis, visualization and algorithm development. Many operations like image segmentation, image enhancement, noise reduction, geometric transformations, image registration, and 3D image processing can be performed.

2. METHODOLOGY

Information of image can be understood by knowing the basics of camera analysing. An image is a combination of a number of pixels and each pixel corresponds to a specific code. All these pixels together form an image. These codes are used for defining the colours which is further used for pixel labelling. Through this pixel labelling the colours in a picture can be recognised.

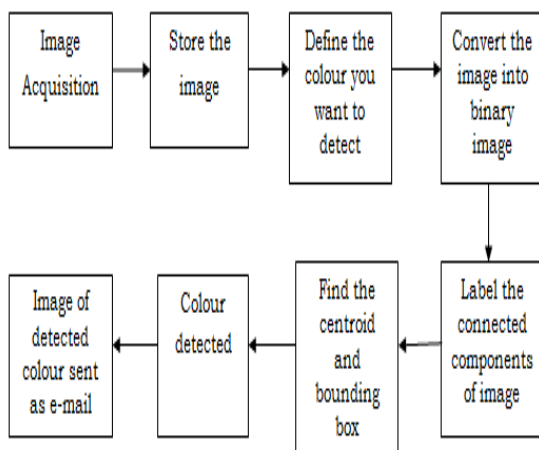


Fig.1 Block diagram

3. IMPLEMENTATION OF ALGORITHM

This algorithm tracks the objects of desired colour and draws a bounding box around them and sends the image of object detected as an e-mail. This works on the difference between frames concept. Every frame in the video is returned as an rgb image on which we can do image processing.

The first stage of this process is to acquire the camera information connected to the laptop. Then the area is monitored using

this camera. When the video acquisition starts, the video is made into frames. After receiving some frames it takes snapshot of every frame.

To track the red objects in a live video the red components must be subtracted from the image. Now the RGB image should be converted to gray scale image, the grayscale format of the image will be a two-dimensional image containing the intensity value of each of the pixel of the image. Usually a grayscale image increases the speed of processing, ease of visualization, and reduces complexity of code by converting a three-dimensional image into two-dimensional image resulting in reduction in number of bits used to represent each pixel of an image.

Subtraction of gray scale image from the red band image is done to extract the red components of the image.

Median filtering is used to remove unwanted noise in the image. Here the pixel value is converted into median of 3X3 sampling window while keeping the value of the border pixel values unchanged.

The obtained image is converted into black and white image based on the threshold value given to red colour. All the objects of detected colour having less than 300 pixels are removed from the image. The boundaries of the image are formed by randomly selecting one of the detected pixels and moving it either clock-wise or anti-clockwise. Here boundaries of an object are searched diagonally (in 8

connected pixels). The detected object is shown in a rectangular box.

When the desired colour object is detected a snapshot of the image is taken and sent as an e-mail to the security.

4. RESULT

The MATLAB code is written to detect the primary colours red, green and blue.

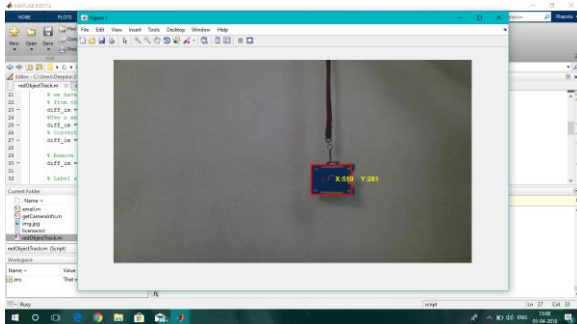


Fig. 2 Blue object detected

Fig. 2 shows the image of a blue colour object detected after running the MATLAB program. A red colour object is detected in the area monitored by the web camera and also the detected object is enclosed in a bounding box with X and Y co-ordinates.

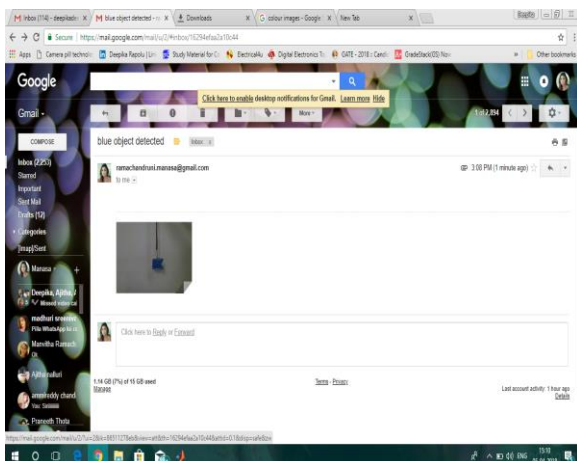


Fig. 3 E-mail alert of object detected

When the desired colour object is detected an alerting message is sent to e-mail as shown in fig. 3.

5. CONCLUSION

The main objective of this paper is to detect desired colour objects in a mob and alerting the security by sending an alerting message like e-mail using image processing algorithms. The image processing techniques are used to detect the desired primary colours red, green and blue. A MATLAB code is developed to detect the desired primary colours and to send the e-mail. The place will be monitored by a web camera and if the desired colour is detected, an alerting message along with the image is sent to e-mail. This project will be very useful in finding the suspicious persons in a mob and also in searching applications.

6. FUTURE SCOPE

1. Spy robots- Spy robots can be made to detect the object properties like colour and shape.
2. Object Segregation-A group of objects can be segregated based on its colour by adding object shape detection algorithm. This will be very useful in industries.
3. Object Tracking- An object can be tracked based on its colour.

7. REFERENCES

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